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ABSTRACT

This paper presents findings of a 6-year study exploring factors contributing to postsecondary school attendance or nonattendance by youth with disabilities based on data from the National Longitudinal Transition Study of Special Education Students (NLTS) for 8,000 students, ages 13 through 21, with disabilities. Factors found to be related to enrollment in postsecondary institutions included student ability/achievement, parental education, family/school urbanicity, parent expectations, enrollment in academic classes, and involvement in high school group activities. Students who were mainstreamed in high school academic classes were found to be more likely to go on to postsecondary education, and students who displayed antisocial or behavioral problems were found to be less likely to enroll in postsecondary education. Findings for postsecondary academic programs were similar to those for vocational programs. Appendices provide background information on the NLTS sample and a list of 19 reports and papers based on the NLTS. (Contains 45 references.) (PB)

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April 1993

WHAT MAKES A DIFFERENCE? FACTORS RELATED TO POSTSECONDARY SCHOOL ATTENDANCE FOR YOUNG PEOPLE WITH DISABILITIES

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WHAT MAKES A DIFFERENCE? FACTORS RELATED TO POSTSECONDARY SCHOOL ATTENDANCE FOR YOUNG PEOPLE WITH DISABILITIES

Parents of children with disabilities hold very much the same hopes for their children as do other parents; parents want their children to be as independent, self sufficient, and self fulfilled as possible when they reach adulthood (Mercer and Chavez, 1990).

A frequent measure of adult independence and success for youth with disabilities has been employment status. The key role of employment in the successful transition from high school to adulthood is evidenced in the establishment by the U.S. Department of Education of "a national priority on improving the transition from school to working life for all individuals with disabilities" (Will, 1984).

When youth with disabilities are compared with their peers in the general population, at 3 to 5 years after high school they showed very similar increases in competitive employment rates, compared with rates 3 years earlier (D'Amico, 1992). Youth in some disability categories, those classified as learning disabled and speech impaired, showed such large gains that their employment rates had reached those of youth in the general population (D'Amico, 1992).

When the National Longitudinal Transition Study (NLTS) focused on the transition from high school to adulthood for youth with disabilities, in many respects youth with learning disabilities or speech impairments appeared to be success stories in the transition arena. In addition to large increases in employment, these youth made significant progress toward residential independence and were among the most socially active, seeing friends and family members often.

Despite these gains made, one sobering aspect of their experiences must be noted. Only about 15% of youth with disabilities had earned a postsecondary certificate, degree or license, and few were continuing to work toward completing programs (Marder, 1992). This relatively low rate of involvement in postsecondary education may mean that they will reach a "ceiling" in their progress toward independence. Whereas their early experiences mirror fairly well youth in the general population, the higher rates of postsecondary education among youth in general will enable them to apply their newly acquired skills toward better jobs and greater financial

independence. We do not see evidence that the majority of youth with disabilities will have newly acquired skills with which to make the same strides forward in future years.

In recent years, unemployment among high school graduates was more than twice as common as among college graduates (Mincer, 1990). Among those who have jobs, the average wage gap between people with various levels of education has grown and promises to continue to do so. For example, in the mid 1980s, college graduates earned almost 60% more than high school graduates (Murphy and Welch, 1990). As young adults are out of high school longer, and begin to complete their degrees and enter the workforce, the gap between those who have postsecondary credentials and those who do not, begins to widen.

At 3 to 5 years after high school we begin to see the effects of the difference in postsecondary attendance rates for youth with disabilities, compared with peers in the general population. Despite the employment gains made by youth with disabilities, there was little aggregate movement in the types of occupations held; they continued to hold relatively low status jobs. In comparison, perhaps due to their greater participation in postsecondary education, youth in the general population experienced a shift toward higher status occupations (D'Amico & Blackorby, 1992).

The benefits of attending postsecondary school for youth with disabilities are not limited to economic effects. Postsecondary schools can provide support services, such as counseling and job placement services, and important opportunities for social interaction and intellectual growth. Yet postsecondary education was much less common for young people with disabilities than others.

Why do so few youth with disabilities attend postsecondary school? Although youth with higher IQs were more likely to have gone on to postsecondary education or training after high school than were youth with lower IQs (Butler-Nalin and Wagner, 1991), in all IQ categories, some youth became postsecondary school students, and the majority did not. What makes the difference? How do students in postsecondary programs differ from their peers not enrolled in postsecondary schools? Can educators and service providers improve the odds that youth with disabilities will attend postsecondary schools? How?

This paper addresses these questions based on analyses from the National Longitudinal Transition Study (NLTS). Conducted by SRI International for the Office of Special Education Programs (OSEP) of the U.S. Department of Education, this six year study includes a nationally representative sample of more than 8,000 students, who were ages 13 to 21, and in special

education in the 1985-86 school year. The sample represents youth in all 11 federal disability categories, and permits findings to be generalized nationally for each disability group. Data were collected in 1987 and again in 1990, from telephone interviews with parents and youth, from school records, including secondary school transcripts, from teacher questionnaires and from a survey of educators in the schools attended by students in the sample.*

Postsecondary school enrollment of a subset of this sample, those students who were in secondary school in 1987 during the first wave of NLTS data collection and were out of secondary school in 1990 when the second wave of NLTS data collection took place is the focus this paper.

In examining the relationship of high school and student background factors to postsecondary enrollment, we will be focussing on two types of postsecondary education: enrollment in a vocational program (a postsecondary vocational school or vocationally oriented 2-year college program), and enrollment in an academic program (an academically oriented 2-year college program or a 4-year college/university.) The paper begins with a description of postsecondary school enrollment, and then continues with an examination of some of the factors that theory, research and experience suggest relate to postsecondary attendance of youth with disabilities.

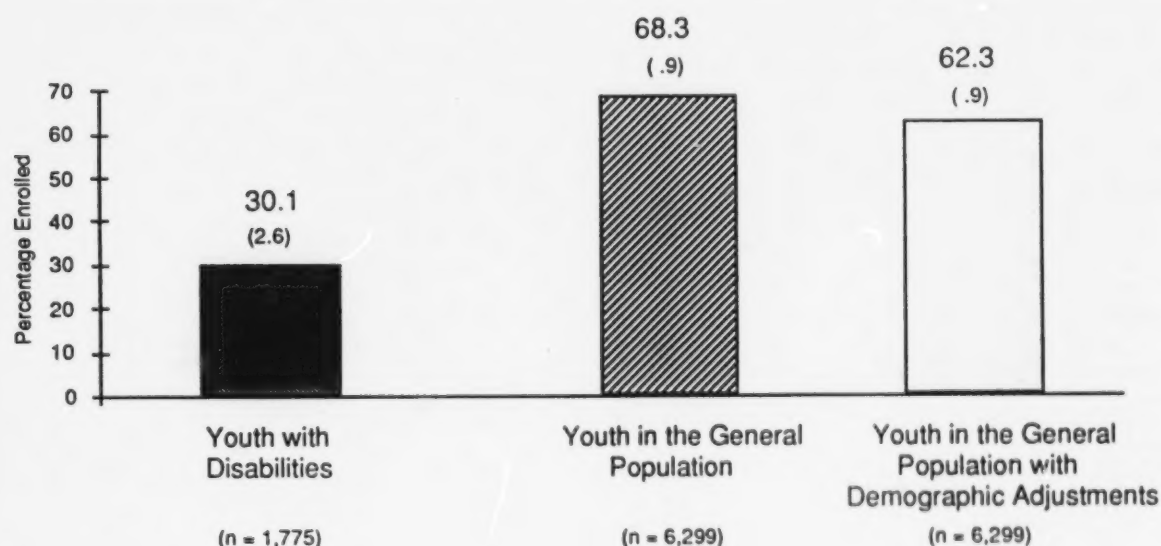
ENROLLMENT IN POSTSECONDARY SCHOOLS SHORTLY AFTER HIGH SCHOOL

There is little question that our society is placing increasing importance on education and training beyond high school. The majority of Americans believe that education is a central part of achieving the "American Dream" (Chicago Sun Times, 1987). It is also clear that opportunities for postsecondary education and training for youth with disabilities are expanding. For example, the Directory of College and Career Programs for Deaf Students now lists more than 150 postsecondary schools with programs for deaf students; 27 were listed in its first edition 15 years ago (Rawlings, Karchmer, and Decaro, 1988).

Despite the growth in the importance placed on postsecondary education and on the opportunities to acquire it, enrollment in 2-year or 4-year colleges or postsecondary vocational trade schools still was fairly rare among youth with disabilities in the first 3 years after high school. As indicated in Figure 1, less than one third (30%) of students with disabilities had

* Appendix A has a more detailed description of data collection, data weighting, and analyses. Appendix B lists other products available from the NLTS, including full reports on sampling and data collection methods; see Wagner, Newman and Shaver, 1989; Javitz and Wagner, 1990, and Marder, Habina and Prince, 1992

enrolled in any type of postsecondary training. This rate is much lower than the enrollment of rate of 68% for youth in the general population who had been out of school slightly longer (up to 5 years) $p < .001$. Even when data for the general population of youth are adjusted to match youth with disabilities for gender, ethnic background, and head of household's educational level, they show a significantly higher enrollment rate in postsecondary schools than youth with disabilities (62%, $p < .001$ when out of high school less than 5 years).*



Note: Data for the general population come from the 1979-1986 National Longitudinal Survey of Youth. General population is adjusted to match youth with disabilities for gender, ethnic background, and head of household's educational level.

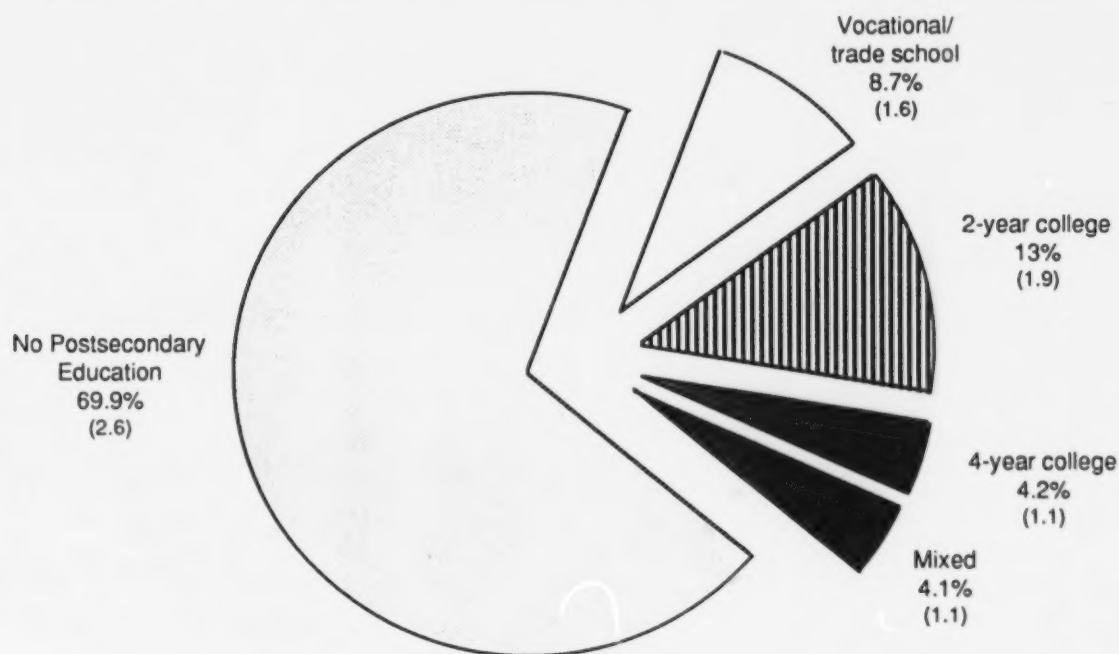
Youth with disabilities had been out of school up to 3 years, those in the general population had been out of school up to 5 years. Youth in the general population who had been out of school up to 2 years had an enrollment rate of 53.1% (1.0) and 47% (.9) for those in the general population with demographic adjustments.

Standard errors are in parentheses.

FIGURE 1 POSTSECONDARY SCHOOL ENROLLMENT OF YOUTH WITH DISABILITIES AND YOUTH IN GENERAL

- * The enrollment of 30% for youth with disabilities who had been out of high school up to 3 years is also significantly lower than the rate of 53% ($p < .001$) for youth in the general population, and the rate of 47% ($p < .001$) for those in the general population adjusted to match youth with disabilities for gender, ethnic background, and head of household's educational level, who had been out of school for only 2 years (1 year less than those with disabilities).

Young adults with disabilities who attended postsecondary schools reported enrollment in 3 types of postsecondary institutions: vocational/trade schools, 2-year colleges and 4-year colleges. As presented in Figure 2, students were most likely to have been enrolled in 2-year colleges (13%), followed by vocational schools (9%). Attendance at 4-year colleges was less common, with only 4% having attended this type of school. Slightly more than 4% had attended two or more of these types of schools in the first few years after high school.



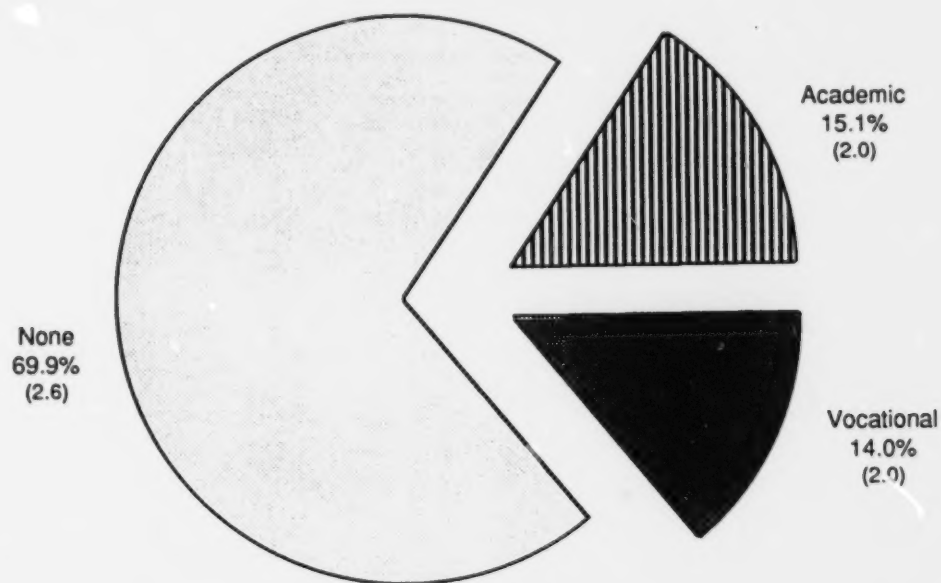
Standard errors are in parentheses.
Source: NLTS parent and youth interviews.

FIGURE 2 TYPES OF POSTSECONDARY SCHOOLS ATTENDED BY YOUTH WITH DISABILITIES (n=1,775)

Although 2-year colleges were the type of postsecondary institution most frequently attended, student experiences at these schools often varied by the focus of the students' programs. Many 2-year colleges offer both academic and vocational programs. To understand better the postsecondary education programs of students with disabilities, the NLTS asked whether students at 2-year colleges had "taken mostly vocational courses to train

him/her for a job, like auto repair or office work, or mostly academic courses, like English or science?" Students at 2-year colleges taking primarily vocational programs were included with those attending postsecondary vocational schools to determine the total propensity of students to take vocational programs. Similarly, 2-year college students taking primarily academic programs were included with youth attending 4-year colleges to determine the percentage of youth with disabilities pursuing academic studies.

Young adults with disabilities attending 2-year colleges were more than twice as likely to be enrolled in an academic program as a vocational program (69% vs. 27%; $p < .001$). With this large percentage enrolled in 2-year academic programs, students with disabilities were about as likely to be enrolled in an academic postsecondary program as in a vocational postsecondary program; 15% enrolled in an academic program and 14% enrolled in a vocational program (Figure 3).



Note: .9% of those enrolled in postsecondary education had not indicated whether they were in a vocational or academic 2-year college program

Standard errors are in parentheses.

Source: NLTS parent and youth interviews.

FIGURE 3 ENROLLMENT IN ACADEMIC AND VOCATIONAL POSTSECONDARY PROGRAMS (n=1,775)

Considerable research has focused on identifying the characteristics of students who enroll in postsecondary schools. The NLTS has drawn on available research on both typical students and those with disabilities to construct a conceptual framework that specifies factors expected to relate to the likelihood that a student will enroll in a postsecondary program. The framework in Figure 4 depicts these hypothesized relationships.

Chief among the factors hypothesized to impinge on postsecondary enrollment are the characteristics of the individual and the household from which he or she comes (depicted in Box A of the conceptual framework). One set of background factors relates to the abilities and disabilities that characterize special education students.

INDIVIDUAL/FAMILY CHARACTERISTICS

Disability Related Characteristics

Students who receive special education services are far from a homogeneous group. During the 1985-86 school year (when these students were sampled from information provided by school districts), there were approximately 1.5 million special education students between the ages of 13 and 21 in schools in the United States (U.S. Department of Education, 1988). Federal assistance was made available to states based on the number of students determined to be eligible for special education services in 11 disability categories: learning disabled, seriously emotionally disturbed, speech impaired, mentally retarded, visually impaired, hard of hearing, deaf, orthopedically impaired, other health impaired, multiply handicapped and deaf/blind.

Student enrollment in postsecondary education varied widely in terms of their primary disability category. Students with sensory impairments, especially those categorized as visually impaired or hard of hearing were the most likely to continue their post secondary school education; while those classified as mentally retarded or multiply handicapped were the least likely.

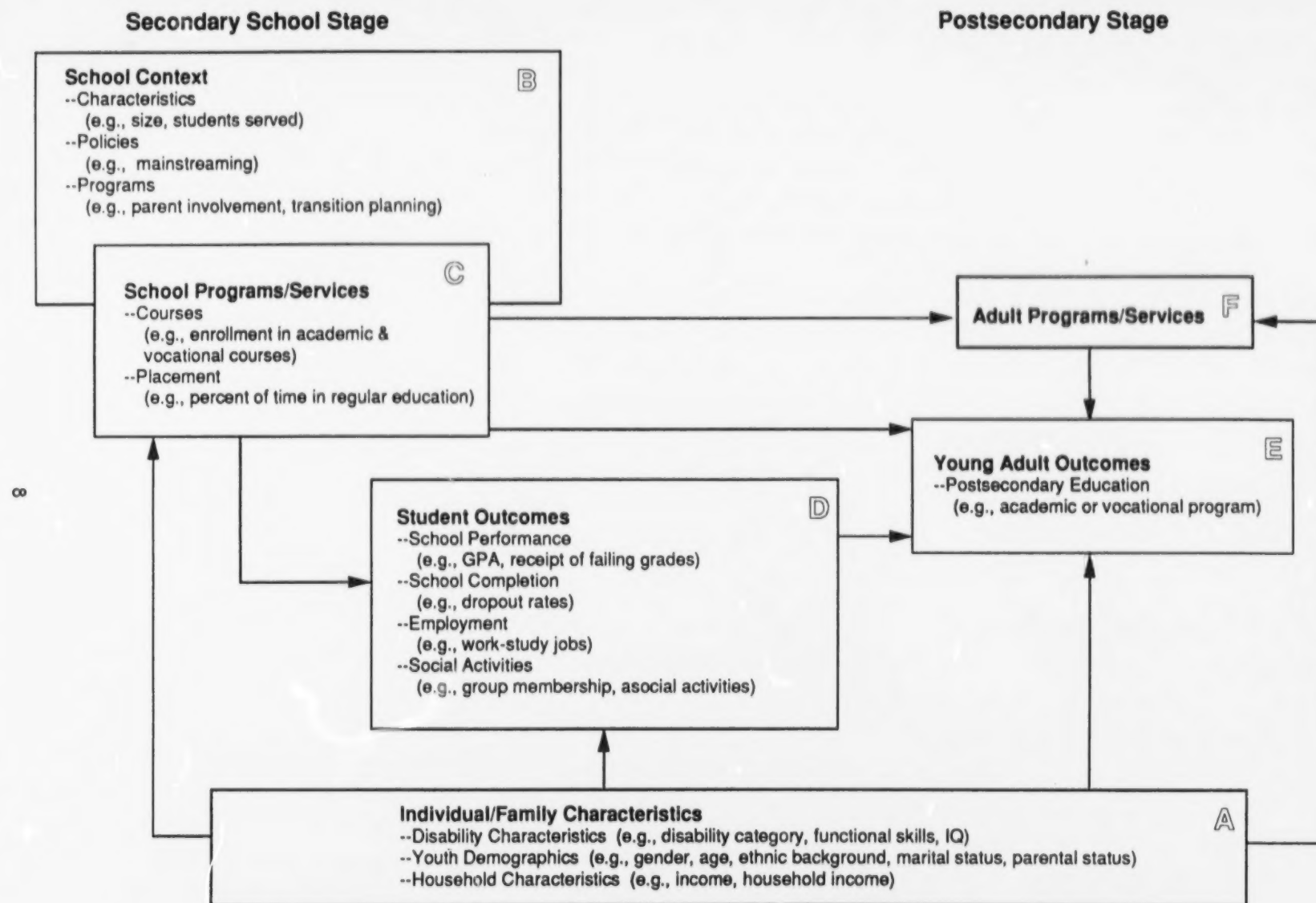


FIGURE 4 CONCEPTUAL FRAMEWORK—HYPOTHESIZED RELATIONSHIPS OF YOUTH, HOUSEHOLD, AND SCHOOL FACTORS TO ENROLLMENT IN POSTSECONDARY SCHOOLS

Although youth with visual impairments were the most likely to continue on to postsecondary schools, they made up a very small proportion of the population of youth with disabilities within postsecondary schools. As presented in Table 1, youth with learning disabilities accounted for more than 68% of those in academic postsecondary programs and 74% of those in vocational postsecondary programs, while those with visual impairments accounted for only 2% of those in academic and 1% of those in vocational programs.

Table 1
DISABILITY CLASSIFICATION BY POSTSECONDARY ENROLLMENT

Youth's Disability	None	Academic	Vocational
Learning disabled	55.1 (3.3)	68.4 (7.1)	73.6 (6.7)
Emotionally disturbed	9.0 (1.9)	8.7 (4.3)	8.1 (4.2)
Speech impaired	2.7 (1.1)	8.4 (4.2)	4.0 (3.0)
Mentally retarded	27.4 (3.0)	2.9 (2.6)	7.9 (4.1)
Visually impaired	.4 (.4)	2.3 (2.3)	.6 (1.2)
Hard of Hearing	.5 (.5)	1.7 (1.9)	1.1 (1.6)
Deaf	.7 (.6)	1.3 (1.7)	1.2 (1.7)
Orthopedically impaired	1.1 (.7)	2.2 (2.2)	1.0 (1.5)
Other health impaired	1.0 (.7)	3.0 (2.6)	2.1 (2.2)
Multiply handicapped	1.8 (.9)	.7 (1.2)	.3 (.9)
Deaf/blind	.2 (.3)	.3 (.8)	.1 (.4)
n	1,030	467	256

Standard errors are in parentheses.
Source: NLTS parent interviews.

Students with speech and sensory impairments tended to be more likely to have enrolled in academic programs, while students with mental retardation tended to be more likely to have enrolled in vocational programs (although with only 15% of all youth with disabilities enrolled in either of these postsecondary programs, and dividing this 15% into 11 disability categories results in large standard errors, there are no statistically significant differences).

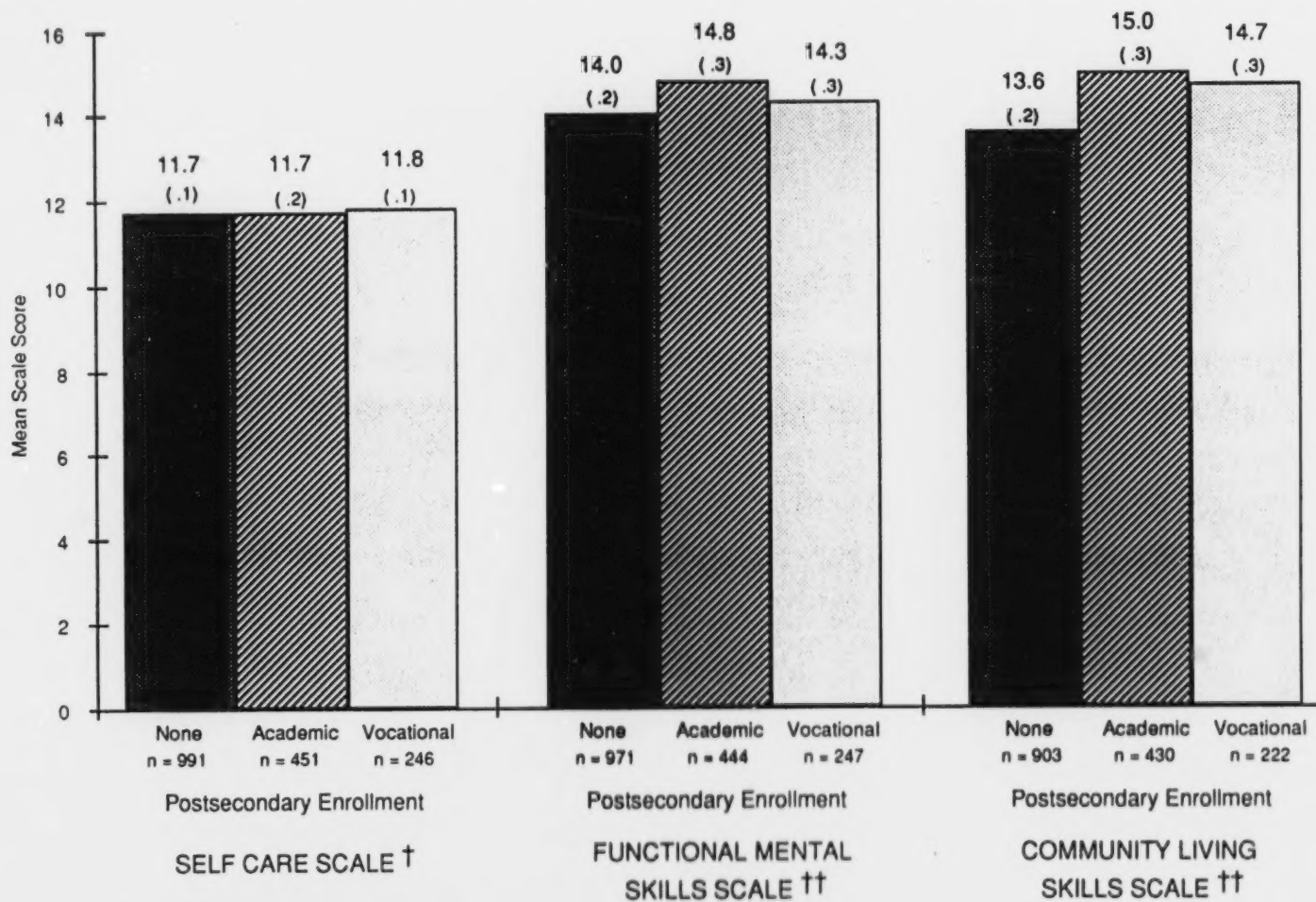
Functional Abilities

Primary disability classifications provide a very broad indicator of the needs and capabilities of special education students. However, 11 categorical labels cannot reflect the great diversity of mental, sensory, and physical conditions that affect youth. Some categories are quite broad, encompassing a variety of specific disabilities, and all categories include youth who range widely in severity of disability. To understand fully the profile of abilities and disabilities of secondary special education students, one must look beyond the categorical labels.

To learn more about the impact of disabilities on various aspects of youths' functioning, the NLTS asked parents to assess their children's abilities to perform independently three kinds of daily living skills. The first involved very basic self-care tasks on their own, without help: the second involved the application of selected functional mental skills to everyday tasks, and the third involved the performance of specific aspects of community living. These ratings were taken at the time these young adults were in high school.*

As indicated in Figure 5, although postsecondary enrollment did not vary based on self care skills, functional mental skills and community living skills were related to postsecondary enrollment. Students enrolled in academic postsecondary programs had scored significantly higher, when they were in high school, on the functional ability and community living scales, than did those not enrolled in any postsecondary education (14.8 vs. 14.0; $p < .05$ and 15.0 vs. 13.6; $p < .001$). Students in vocational postsecondary programs did not score significantly higher than those not in postsecondary schools on their functional skills scales, but they did perform significantly better on the community living scale (14.3 vs. 14.0 n.s. and 14.7 vs. 13.6; $p < .01$). In none of these scales did students in academic programs' performance differ significantly from those enrolled in vocational programs.

* See Appendix for description of scales.



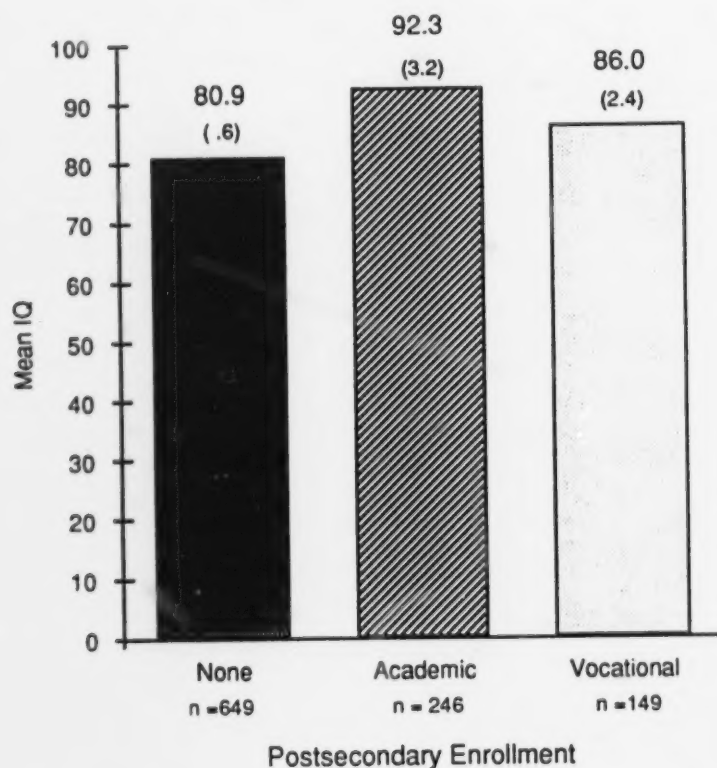
† The self care scale ranges from 3 to 12

†† The functional mental skills and community living skills scales range from 4 to 16.
Standard errors are in parentheses.

Source: NLTS parent interviews.

FIGURE 5 MEAN FUNCTIONAL ABILITY SCALE SCORES OF YOUTH WITH DISABILITIES

These skills scales relate to a youth's ability to perform very basic tasks, as assessed by parents at the time they were interviewed. In contrast, intelligence tests are meant to measure general mental ability (Wechsler, 1958); (although the extent to which they accomplish this is controversial). Similar to their performance on the functional mental and community living scales, students in academic and vocational programs scored significantly higher on IQ tests than did those not attending postsecondary classes (92.3 scored by those in academic programs, and 86.0 scored by those in vocational programs vs. 80.9 scored by those not enrolled; $p < .01$ and $p < .10$) (Figure 6). Although there were no statistically significant differences in scores earned by those in academic and vocational programs, there was a consistent pattern of students in academic programs earning higher scores on the scales and IQ tests.



Standard errors are in parentheses.
Source: School records.

FIGURE 6 VARIATIONS IN IQ SCORE BY POSTSECONDARY ENROLLMENT OF YOUTH WITH DISABILITIES

Youth Demographics

For young adults with disabilities there were no significant differences in postsecondary education participation based on gender and ethnic background (Table 2).

Students in academic postsecondary programs tended to be younger than their peers, both in vocational programs and not in postsecondary programs, (19.4 years for those in academic programs vs. 20.0 years for those vocational programs; $p < .05$ and 19.9 years for those not enrolled; $p < .05$). As we saw earlier, those in academic postsecondary programs tended to be more capable students, and, as will be presented later, they tended to fail fewer courses. It is likely that these students took less time to complete their secondary, (and possibly earlier) school years, and were therefore younger when enrolled in postsecondary school.

When we shift our focus to background characteristics that are more volitional, such as marriage and having children, we find significant differences in postsecondary education participation. Students in academic 4-year and 2-year colleges were significantly less likely to be married (2%), than were their peers both in vocationally focused schools (12%; $p < .10$), and those who had never attended college (11%; $p < .001$). Youth who had never been enrolled in postsecondary school were significantly more likely to be parents (16%) than were those in academic programs ($p < .001$).

Household Characteristics

We also find significant differences in postsecondary educational enrollment related to the socioeconomic status of youth. As indicated in Table 3, young adults in academic programs were significantly more likely to have come from households with higher incomes than were those who were not attending postsecondary schools (45% vs. 30%; $p < .10$). Similarly, head of household's education was related to postsecondary enrollment, with those in academic programs being more likely to come from families where parents had attended postsecondary school (46%) than were those in vocational programs (26%; $p < .10$), and those not enrolled in postsecondary programs (20.3%; $p < .001$). Although enrollment in vocational programs, as compared with no enrollment in postsecondary education, was higher for those from wealthier, better educated families this was not a statistical difference.

Table 2
INDIVIDUAL CHARACTERISTICS OF YOUTH WITH DISABILITIES
BY POSTSECONDARY ENROLLMENT

Individual Characteristics	None	Academic	Vocational
GENDER			
Male	70.2 (3.1)	60.3 (7.4)	73.8 (6.7)
Female	29.8 (3.1)	39.7 (7.4)	26.2 (6.7)
n	1,030	467	256
ETHNIC BACKGROUND			
White	66.8 (3.2)	56.6 (7.5)	64.1 (7.3)
Black	23.3 (2.9)	26.5 (6.7)	25.4 (6.7)
Hispanic	7.7 (1.8)	11.9 (4.9)	8.5 (4.3)
n	1,016	465	255
AGE			
Mean age at time of second interview	19.9 (.1)	19.4 (.2)	20.0 (.2)
n	1,030	467	256
MARITAL STATUS			
Single/Never married	81.0 (2.6)	92.3 (4.0)	84.2 (5.6)
Married/Living with member of opposite sex	11.3 (2.1)	1.7 (2.0)	11.5 (4.9)
n	1,049	466	256
PARENTAL STATUS			
Percent who have children	15.6 (2.4)	2.5 (2.4)	8.6 (4.3)
n	1,051	467	256

Standard errors are in parentheses.
Source: NLTS parent interviews.

Table 3
HOUSEHOLD CHARACTERISTICS OF YOUTH WITH DISABILITIES
BY POSTSECONDARY ENROLLMENT

Individual Characteristics	None	Academic	Vocational
HOUSEHOLD INCOME			
Average household annual income more than \$25,000	29.7 (3.3)	45.1 (7.9)	38.9 (7.8)
n	926	417	234
HEAD OF HOUSEHOLDS' EDUCATION LEVEL			
11th grade or less	38.9 (3.4)	28.2 (6.9)	31.0 (7.2)
High school graduate	40.8 (3.4)	26.2 (6.8)	42.8 (7.7)
Beyond high school	20.3 (2.8)	45.6 (7.7)	26.2 (6.8)
n	987	451	250

Standard errors are in parentheses.

Source: NLTS parent interviews; refers to income and education level of parent's household.

This relationship of socioeconomic status to postsecondary enrollment for youth with disabilities mirrors findings for youth in the general population. Socioeconomic status has been found to be positively associated with postsecondary enrollment for youth in the general population (Alexander, et al., 1978, Corazzini et al., 1972, Stage & Hossler, 1989).

HIGH SCHOOL CHARACTERISTICS

Students brought their diverse backgrounds and abilities to their secondary schools, and the high schools they attended also were diverse. High schools differed in characteristics such as size and urbanicity, and in the programs and services they offered.

One important distinguishing feature of a student's high school educational program is the type of high school he or she attended, such as comprehensive high schools, special schools

for students with disabilities and vocational schools. There is a pattern of relationship between type of secondary school and postsecondary enrollment, although these are not statistically significant. Students who attended academic postsecondary schools tended to be more likely to have come from regular, comprehensive high schools, and less likely than their peers to have come from either special schools for students with disabilities or vocational schools. Those who attended vocational postsecondary schools appeared more likely than their peers to have come from vocational technical high schools (Table 4).

While high school size did not seem to be related to enrollment in a postsecondary institution, there did appear to be a relationship between high school location and subsequent postsecondary school enrollment. Youth who had never enrolled in postsecondary schools were more likely to have attended rural high schools and less likely to have attended urban high schools than were their peers (e.g. 27% of those never enrolled in postsecondary school had attended an urban high school as compared with 41% of those enrolled in academic postsecondary programs; $p < .10$). Urbanicity was also related to postsecondary enrollment for students in the general population. Those from families living in urban areas were more likely to attend postsecondary schools (Anderson et al., 1972).

Consistent with our earlier discussion of individual characteristics of ethnic background and family income, the percentage of minority students in high schools attended by those in both types of postsecondary programs as well as those not enrolled in postsecondary schools did not significantly differ. Those never enrolled in postsecondary programs were significantly more likely to have attended high schools with high percentages of low income students (21% of those not in postsecondary school attended high schools where more than 50% of the students were from low income families, compared with 10% of those enrolled in academic programs, $p < .05$).

Table 4
HIGH SCHOOL CHARACTERISTICS OF YOUTH WITH DISABILITIES
BY POSTSECONDARY ENROLLMENT

Characteristics	None	Academic	Vocational
TYPE OF HIGH SCHOOL			
Comprehensive high school	89.7 (2.1)	96.0 (3.0)	85.2 (5.7)
Vocational technical school	2.3 (1.0)	.9 (.5)	6.9 (4.1)
Special school for students with disabilities	6.4 (1.7)	2.8 (2.5)	3.6 (3.0)
n	954	433	236
SCHOOL SIZE			
Average size of comprehensive high school	981.9 (48.5)	1,114.3 (95.1)	1,019.2 (129.7)
n	653	343	173
URBANICITY			
Urban	26.6 (3.0)	40.8 (7.8)	30.9 (7.3)
Suburban	35.6 (3.3)	33.0 (7.4)	39.0 (7.7)
Rural	37.8 (3.3)	26.2 (7.0)	30.1 (7.2)
n	825	371	202
ENROLLMENT			
Percentage of schools with more than 50% minority enrollment	21.5 (2.9)	26.0 (6.9)	25.6 (7.1)
n	925	413	227
Percentage of schools with more than 50% low income student enrollment	21.3 (2.9)	9.6 (4.6)	15.3 (5.9)
n	923	407	223

Standard errors are in parentheses.
Source: NLTS parent interviews.

Transition Activities

In addition to differences in basic school characteristics, such as size and ethnic makeup of student body, schools varied on the extent of their involvement in transition planning and in coordination with other schools and agencies.

By 1990, transition planning had been recognized as an exemplary practice in secondary special education. Transition planning is the practice by secondary schools of setting goals and identifying activities to occur during high school to prepare the youth for the eventual transition to adult life. The planning also includes identifying and contacting postsecondary education and training institutions and other appropriate adult services in order to facilitate the movement by youth with disabilities from high school to adult life. Transition planning may involve postsecondary education and adult service personnel in addition to various school personnel, parents, and the student. In order to learn more about transition planning, the NLTS conducted a substudy of certain youth. The population for the substudy included only youth with learning disabilities, emotional disturbances, speech impairments, and mental retardation who were in their last year of high school.

Eighty percent of the schools attended by youth with disabilities in the NLTS substudy did transition planning, not significantly differing by postsecondary enrollment.

As part of this transition planning process, goals are set for each student for the period immediately following high school. As indicated in Table 5, the majority of youth attending postsecondary education and training as well as those not pursuing postsecondary education achieved their immediate post-school transition goals. For youth who went on to academic postsecondary programs, 56% of them had identified 2- or 4-year college programs as their primary immediate goal upon completing high school. Youth who went on to vocational programs had slightly more varied transition goals: 49% had identified postsecondary vocational training as their immediate goal, 35% had identified postsecondary education in a 2 or 4 year college, and 58% had identified employment. Youth who did not go on to any postsecondary education or training had focused their transition goals on immediate employment following high school completion; almost 65% of these youth identified competitive employment as their goal.

Table 5
TRANSITION ACTIVITIES BY POSTSECONDARY ENROLLMENT

Characteristics	None	Academic	Vocational
HIGH SCHOOL DOES TRANSITION PLANNING*	81.3 (4.9)	88.1 (7.8)	80.2 (11.7)
n	170	57	41
PRIMARY GOAL OF STUDENT'S HIGH SCHOOL EDUCATIONAL PROGRAM*			
2-4 year college	13.7 (4.2)	56.1 (11.7)	34.5 (14.0)
Postsecondary vocational training	27.9 (5.5)	21.7 (9.8)	49.3 (14.7)
Employment	64.7 (5.9)	40.6 (11.6)	57.7 (14.5)
n	179	60	41
AMOUNT OF HIGH SCHOOL'S CONTACT WITH COLLEGES†			
Several times/year	26.1 (3.4)	51.6 (8.6)	14.0 (6.5)
n	735	341	178

Standard errors are in parentheses.

* From NLTS substudy of students with learning disabilities, emotional disabilities, speech impairments, and mental retardation in their last year of high school. Data from teacher survey.

† From NLTS main study. Data from wave 1 school survey.

While more than 80% of all high schools were involved in planning for the successful transition of students with disabilities, many fewer high schools were involved in actively coordinating with postsecondary schools. NLTS high schools, in the main study, were asked to indicate how often their special education personnel had contact with staff from several types of agencies, including colleges, to prepare for the transition of secondary special education students. More than half (53%) of all NLTS high schools reported "hardly ever" contacting colleges. When we examine the relationship of students' post high school educational experiences with the extent of their high schools' contact with colleges, we do find

differences by postsecondary school outcomes. As indicated on Table 5, students in academic college programs were significantly more likely to have attended high schools that had more frequent contact with colleges; 52% of academic students had gone to schools that had contacted colleges several times a year, as compared with 26% of those not in postsecondary programs ($p < .01$) and 14% of those in vocational programs ($p < .001$).

Because the NLTS did not specify the type of college it is probable that high school staff were more likely to think of traditional 2 or 4 year colleges instead of vocational schools when completing the questionnaire. This might partially account for the low percentage of those in vocational postsecondary programs having attended high schools that had frequent contact with colleges.

Parent Involvement

Parent involvement has been identified as an important aspect of a successful transition from school to adult life by youth with disabilities (Nisbet, Covert, & Schuh, 1992). Parents provide support to the student, information to school personnel about the student, and continuity between home, school, and the community during the transition process. Involved parents can also improve the youth's level of performance in school by monitoring homework and other aspects of the youth's progress. As part of the NLTS substudy, the level of attendance by parents at parent-teacher conferences and IEP meetings was calculated as a measure of the level of involvement in the youth's school experience and in the transition planning process. Teachers were also asked to rate the involvement of parents in youths' school experience on a scale of 1 to 4, with 4 being the most involved. As presented in Table 6, students who went on to postsecondary education had parents who were very involved in their child's education, assisting with homework and monitoring youths' progress. The parents of youth who went on to academic and vocational programs were rated at 3.1 and 3.2 respectively. These parents were more involved in their child's education than were the parents of youth who did not pursue postsecondary education, who were rated at 2.7 ($p < .1$ and $.05$ for youth in academic and vocational programs, respectively). Parents of youth in postsecondary education attended parent conferences and IEP meeting more frequently than did parents of youth who did not pursue postsecondary education. Ninety percent of the students who went on to vocational programs and 82% of those who went on to academic programs parents participated in school conferences related to their child, compared with only 73% of the parents of students who had never gone on to postsecondary school.

Table 6
PARENT INVOLVEMENT IN CHILD'S HIGH SCHOOL EDUCATION

Characteristics	None	Academic	Vocational
PARENT INVOLVEMENT SCALE*	2.7 (.1)	3.1 (.2)	3.2 (.2)
PERCENT OF PARENTS ATTENDING IEP AND/OR PARENT-TEACHER CONFERENCES	73% (5.7)	81.7% (9.5)	89.3% (9.4)
n	169	53	37

Standard errors are in parentheses.

Source: NLTS teacher rating of parent involvement, from NLTS substudy of students with learning disabilities, emotional disabilities, speech impairments, and mental retardation in their last year of high school.

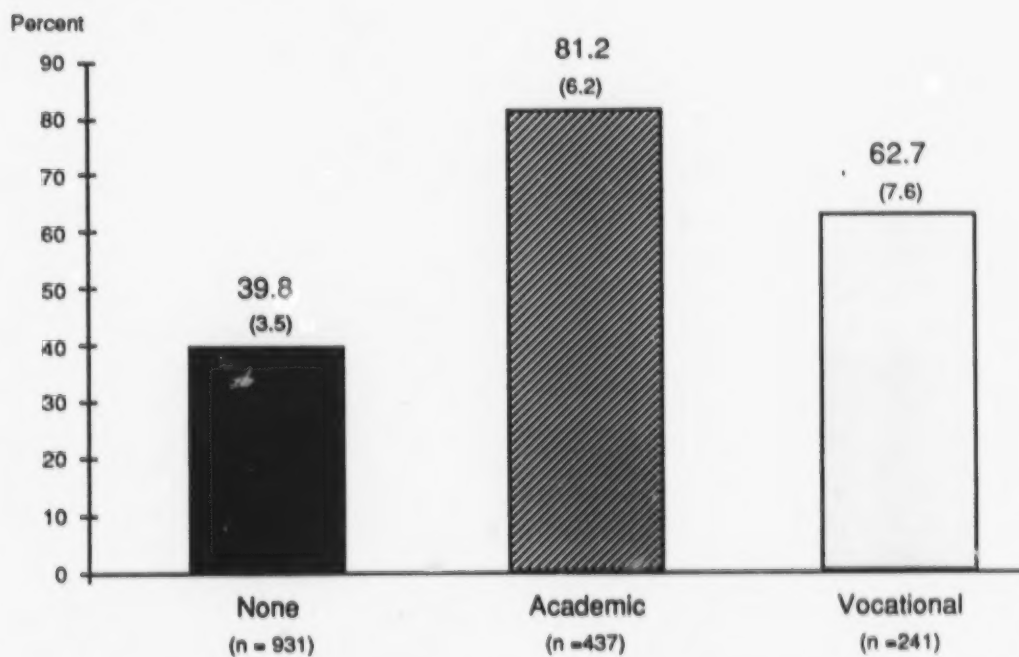
* The scale ranges from 1 to 4.

Parental Expectations

Parental educational expectations have been found by several studies of students in the general population to be related to the likelihood of a student attending a postsecondary educational institution (Ekstrom, 1985; Gilmour et al, 1978; Hossler & Stage, 1988, Soper, 1971). Does this hold true for students with disabilities as well?

When NLTS youth were in high school, their parents were asked to speculate about the future educational attainment of their children by reporting their perceptions of the likelihood that youth would graduate from a 2 or 4 year college. Comparing these expectations with reality 3 years later, we find that youth in both academic and vocational postsecondary programs were significantly more likely than those who had not continued their education to have been expected to attend college. As presented in Figure 7, 40% of those not in postsecondary school were expected to continue on to college, as compared with 81% of those in academic postsecondary programs ($p < .001$) and 63% of those in vocational postsecondary programs ($p < .1$). Those in academic programs were more likely to have been expected to continue their education than were those in vocational programs ($p < .1$); (this is

especially true when parents were asked to speculate about graduation from a 4 year college only, with 68% of those in academic programs predicted to attend, compared with 27% of those in vocational programs, $p < .01$).



Parent expects that youth will graduate from a 2 or 4 year college.

Source: NLTS Wave 1 parent interviews.

Standard errors are in parentheses.

FIGURE 7 PARENT EXPECTATIONS

SCHOOL PROGRAMS/SERVICES

The educational experiences of students in special education are shaped not only by the characteristics of their schools but by the environment in which their courses are taken. A key element of the instructional environment is the nature of the students in it; whether these students are primarily regular education or special education students.

Students in secondary special education traditionally receive their education in a variety of instructional settings, varying primarily in the degree to which special education students are integrated into the regular education system, with regular education students. Although these are students classified as special education students, throughout the 4 years of high school they were consistently more likely to be enrolled in regular education classes than in special education classes, although many students received academic instruction in both settings (Newman, 1993; Blackorby, 1993).

Youth who went on to academic postsecondary education had demonstrated in high school that they could perform successfully in a regular education setting. These youth were significantly more likely than youth who chose vocational postsecondary programs ($p < .05$) or youth who did not go on to postsecondary education ($p < .001$) to have had more of their classes in regular education than in special education (Table 7). Youth in academic postsecondary programs spent nearly 80% of their class time in regular education in high school. By comparison, youth who went on to vocational postsecondary programs spent only about 65% of their class time in regular education, and youth who did not go on to postsecondary education spent 63% of their time in regular education in high school.

Academic Classes

Not only did youth who went on to academic postsecondary education show greater participation in regular education, but their high school programs were more focused on academics and academics in a regular education class. More than 61% of their classes were in academics, compared with 56% for those who did not go on to postsecondary education ($p < .01$). Those in vocational postsecondary programs were also more likely than those not in postsecondary education to have taken academic classes in high school (59% vs. 56%, $p < .1$).

Table 7
HIGH SCHOOL PROGRAMS BY POSTSECONDARY ENROLLMENT

Characteristics	None	Academic	Vocational
DURING HIGH SCHOOL:			
Mean percent time in regular education classes in high school	62.7	79.4	65.6
	(2.2)	(4.1)	(5.3)
n	928	467	251
Mean percent time in academic classes	55.7	61.4	59.3
	(.9)	(1.8)	(1.8)
n	923	467	251
Number of academic credits	10.1	13.0	12.0
	(.3)	(.8)	(.7)
n	917	467	249
Mean percent of academic classes that are regular education classes	51.0	73.0	59.0
	(1.6)	(3.6)	(3.4)
n	916	463	249
Percent enrolled in advanced mathematics	2.8	25.1	11.6
	(1.1)	(6.6)	(5.0)
n	917	467	248
Percent enrolled in foreign language	8.8	46.1	24.5
	(2.0)	(7.6)	(6.7)
n	917	467	248
Mean percent time in vocational courses	24.3	18.0	22.2
	(.9)	(1.5)	(1.7)
n	924	467	251
Number of vocational credits	4.9	3.8	4.8
	(.2)	(.4)	(.4)
n	917	467	249

Standard errors are in parentheses.

* Advanced mathematics includes geometry, trigonometry and calculus

Source: NLTS school records.

We see even larger differences when looking at academic classes taken in a regular education setting. Those in academic postsecondary schools were significantly more likely than both those in vocational programs and those not in postsecondary education to have been enrolled in regular education academic classes. Those in academic postsecondary programs had spent almost three quarters (73%) of their academic class time in regular education academic classes, while those in vocational postsecondary programs had spent 59% of their time ($p < .01$), and those not enrolled in postsecondary education had spent 51% of their time in these types of classes ($p < .001$). Those in vocational postsecondary programs were more likely than those not enrolled in postsecondary education to have spent time in regular education academic classes ($p < .05$).

Youth who continued their academic education beyond high school also were significantly more likely to have taken advanced mathematics and foreign languages. More than 25% of youth in academic postsecondary education had taken advanced math (geometry, trigonometry or calculus) compared with only 12% of youth who went on to vocational postsecondary programs and less than 3% of youth who did not pursue postsecondary education ($p < .001$). The differences in enrollment in foreign language classes were even more dramatic for youth who continued in academic postsecondary education. Of these youth, 46% had taken at least one foreign language class, while only 25% of youth who went on to vocational postsecondary programs ($p < .05$) and 9% of youth who did not pursue postsecondary vocational education ($p < .001$) had taken a foreign language class.

These findings mirror those for students in the general population. Studies of youth in the general population have found that being in an academic track was positively related to postsecondary enrollment (Hossler and Stage, 1992).

Vocational Classes

Earlier NLTS research has found a consistent pattern of beneficial effects of occupationally oriented vocational training. Across several of the in-school and postschool outcomes examined, students who were enrolled in occupationally oriented vocational education were significantly more likely than nonparticipants to register positive outcomes, independent of characteristics of the students who were enrolled. Students who took occupationally oriented vocational courses had significantly lower absenteeism from school and a significantly lower probability of dropping out of school, when demographic and disability differences between

students were controlled. Independent of its effects on students' decisions to dropout, having had vocational training was found to be significantly related to a higher likelihood of finding a paid job in the early years after high school (Wagner, 1991).

As indicated in Table 7, vocational training in high school was not only related to a higher likelihood of having a paid job, as found in earlier NLTS research, it also was related to a higher likelihood of being enrolled in vocational postsecondary programs. Students in vocational postsecondary programs, were significantly more likely to have spent time in vocational classes during high school than were their peers in academic postsecondary programs. Academic postsecondary students had spent 18% of their high school course time in vocational classes, as compared with 22% spent by those who had were enrolled in post secondary vocational education ($p < .1$).

With the relationship of high school vocational training to after high school employment, it is not surprising that those who did not continue their postsecondary education, (those who often opted instead to become employed directly after high school), did not significantly differ in the amount of time they spent in vocational classes from those in postsecondary vocational programs (24% vs. 22%); yet did differ significantly from their peers in academic postsecondary programs (24% vs. 18%, $p < .001$).

SECONDARY SCHOOL PERFORMANCE AND COMPLETION

A student's performance in high school is likely to have an impact on whether they pursue postsecondary education. Research on students in the general population has found that student achievement has a significant impact on postsecondary education plans and enrollment (Carpenter & Fleishman, 1987, Hossler & Stage, 1992, Manski & Wise, 1983, Mare, 1980). High school graduation and a student's GPA are typically used as entrance requirements for college. Failure to pass one or more classes could affect both the GPA and whether the student will persist in school to graduation or to continue their education after high school. These three measures of secondary school performance—percentage of classes failed, overall GPA, and school completion status—were examined.

Students who pursued postsecondary education, regardless of the type of education and training they sought, were significantly less likely to have failed classes in high school than were students who did not enter postsecondary education after high school. There were no differences between youth who went on to academic or to vocational programs in the percent

of classes that they had failed in high school. As indicated in Table 8, youth who did not go on to postsecondary education failed 10% of their classes, while those who went on to academic education had failed 3% of their classes ($p<.01$), as did those who went on to vocational programs ($p<.001$).

Table 8
HIGH SCHOOL PERFORMANCE AND COMPLETION

Individual Characteristics	None	Academic	Vocational
SCHOOL PERFORMANCE			
Percent of classes failed	9.5 (1.6)	3.1 (1.6)	2.7 (1.2)
Overall GPA	2.3 (.1)	2.5 (.1)	2.0 (.1)
n	755	439	224
PERCENT OF SCHOOL LEAVERS WHO:			
Graduated	75.2 (2.9)	94.9 (3.3)	88.1 (4.9)
Aged out	1.1 (.7)	.1 (.4)	.2 (.7)
Dropped out	23.7 (2.8)	5.1 (3.3)	11.6 (4.9)
n	1030	467	256

Standard errors are in parentheses.
Source: NLTS school records.

There was very little variability in overall high school GPA between youth who went on to academic or vocational postsecondary education and those that did not. Students in the three categories all had similar GPA's, with youth who did not attend postsecondary school having an overall GPA of 2.3, youth attending vocational postsecondary schools having a high school GPA of 2.4 and youth attending academic postsecondary schools having a GPA of 2.5. While

the increased number of failed classes for certain youth did not result in significant differences in overall GPA of students in the different categories, it appeared to have eventually impacted the youths' choice to attend postsecondary education.

Graduation from high school also had a significant effect on youth choice to continue their education and training beyond high school. Youth who went on to postsecondary education and training programs were more likely to have graduated from high school than the youth who did not continue their education and training. Almost 95% of youth in postsecondary academic programs had graduated from high school, and 88% of youth in vocational postsecondary programs had graduated. Of youth who did not go on to postsecondary education, only 75% had graduated. (The difference in the percentage between youth who go on to academic programs and youth who do not go on to postsecondary programs was significant at $p < .001$. The difference in the percentage between youth who go on to vocational postsecondary programs and youth who do not go on to postsecondary programs was significant at $p < .05$.) These results are supported by previous findings of the NLTS. Youth with disabilities who drop out of high school are also much less likely than youth in the general population to go on to postsecondary education or training (Marder, 1992).

OTHER ACTIVITIES DURING HIGH SCHOOL

The previous sections have focused on within high school experiences, such as high school programs and performance, yet during their high school years many students were involved in a wide range of activities outside of their classes, including after school employment and participation in social activities. Here we will be examining the relationship of postsecondary attendance to these types of activities.

While several studies have identified work experience during high school as important to preparing students with disabilities for successful employment after high school (Hasazi, 1985, Wehman, Kregel and Barcus, 1985), as presented in Table 9, work experience during high school does not appear to be related to postsecondary enrollment.

Participation in school activities and organizations as part of a student's secondary school experience may positively affect their attitudes and feelings of success about school and eventually their decision to continue their education. Previous research has documented the importance of students bonding with their high schools (Wehlage, 1989; Finn, 1989). This social bonding often is seen in a student's commitment to the norms of the school, in the

involvement in school activities, and in an affiliation with school groups. Participation in extracurricular groups in secondary school has been correlated with high levels of self-esteem, increased student engagement, more expressed satisfaction with school, and increased likelihood of school completion (Pittman and Haughwout, 1987; Holland and Andre, 1987). Earlier NLTS research reported that youth with disabilities who belonged to groups had significantly lower absenteeism and a lower probability of course failure than students who were not affiliated. Extracurricular activity also was linked to a lower likelihood of early school leaving (Wagner, 1991a).

Table 9
RELATIONSHIP OF OTHER ACTIVITIES DURING HIGH SCHOOL TO
POSTSECONDARY ENROLLMENT

Individual Characteristics	None	Academic	Vocational
YOUTH HAD A JOB DURING HIGH SCHOOL	64.7 (3.2)	66.9 (7.2)	66.1 (7.3)
n	1,008	456	252
PERCENT WHO PARTICIPATED IN A GROUP	41.2 (3.4)	74.5 (6.8)	56.3 (7.7)
n	982	452	251
ASOCIAL BEHAVIORS*	8.0 (1.9)	.5 (1.1)	7.9 (4.2)
n	981	451	250

* Youth was suspended/expelled from school, fired from a job, or arrested.
Standard errors are in parentheses.
Source: NLTS parent interviews.

To learn about students' group participation, parents of youth with disabilities were asked whether their children had belonged to any school or community groups in the previous year. As indicated in Table 9, youth who went on to academic postsecondary education had been significantly more involved in school-related groups and activities than youth who did not

continue their education beyond high school. Almost 75% of youth in academic postsecondary education had participated in school-based groups and activities whereas only 41% of youth who did not continue their education had been involved in school-based groups ($p < .001$). More than 56% of youth in postsecondary vocational programs had participated in high school activities as compared with 41% of those that did not pursue postsecondary education ($p < .1$). These findings are similar to those for youth in the general population, where involvement in athletic and service activities during high school increased the likelihood of postsecondary educational attainment (Otto, 1976; Spady, 1975).

In contrast to young people who are positively integrated into society, some youth fail to follow social and legal rules and exhibit a variety of forms of asocial behaviors. Although these behaviors vary in the seriousness of their consequences, some asocial behaviors are not tolerated by society. When such behaviors are exhibited in school, youth can be suspended or expelled. When such behaviors are exhibited on the job, youth can be fired. When asocial behaviors violate the laws of society at large, they can result in arrest. What is the relationship of these types of asocial behaviors to postsecondary enrollment?

As presented in Table 9, students enrolled in postsecondary academic programs were less likely than their peers in postsecondary vocational programs, as well as significantly less likely than those who had never enrolled in postsecondary education to have ever been involved in these types of asocial behaviors. Less than 1% of those in academic programs had exhibited such behaviors, as compared with 8% of those in vocational programs (n.s.) and 8% of those not enrolled in postsecondary programs ($p < .001$).

SUMMARY & DISCUSSION

We began this paper with the statement that parents of children with disabilities hold very much the same hopes for their children as do other parents. As we examined these initial findings on the factors that affect postsecondary participation of youth with disabilities, we learned that although youth with disabilities were significantly less likely to continue on to postsecondary schools than their peers in the general population, many of the factors that influenced the postsecondary enrollment of those with disabilities parallel factors that influence other students.

Factors that were found to be related to enrollment in postsecondary institutions for students in the general population, as well as for those with disabilities, included student

ability/achievement (for those with disabilities, measured by IQ, functional, mental, and community living skills, as well as grades and graduation rates), parental education, SES, family/school urbanicity, parent expectations, enrollment in academic classes, and involvement in high school group activities.

While these family, school and individual characteristics were related to the postsecondary enrollment of all youth, a number of school programming factors may especially influence those with disabilities. Students that were mainstreamed for more of their classes in high school, especially for academic classes, were more likely to be the ones to continue on to postsecondary schools. Perhaps this relationship results from students in mainstreamed classes earning more credits in curricular areas that were prerequisites for postsecondary education (e.g., sciences, math, foreign language), which would aid their transition to further education after high school. Or perhaps students in mainstreamed classes were more exposed to the academic expectations common to students without disabilities and, therefore, were more likely to have aspired to postsecondary education and worked toward that end. For youth in the general population, researchers have found a relationship between educational aspirations and peer support and encouragement (Carpenter & Fleishman, 1987, Tillery, 1973).

While earlier NLTS research has shown that students who are mainstreamed are more capable students, when the nature and severity of their disabilities are included in preliminary multivariate analysis, students who spent a greater percentage of their instructional time in regular education classes were significantly more likely to have enrolled in postsecondary schools, independent of their disability characteristics (Wagner, et al., 1991).

These findings suggest that high schools can influence postsecondary enrollment of students with disabilities in several ways. High schools need to be involved early in assisting and guiding students in developing appropriate high school educational programs, based on goals set in individual transition plans. High schools can also influence the postsecondary school enrollment of their students with disabilities, by actively contacting and coordinating with postsecondary schools. Our data has found that students enrolled in postsecondary schools were significantly more likely to have attended high schools that had frequent contact with staff from colleges. High schools need to take the initiative to create linkages with postsecondary institutions.

Students who had gone on to postsecondary education, both those in the general population and those with disabilities, were more likely to have been involved in high school-

related groups and activities. This suggests the need for high schools to support a wide variety of social, hobby, athletic, service, leadership, and other groups so that students with widely diverse interests and abilities have opportunities to establish group affiliations.

Strong relationships also were found between parent involvement, parent expectations and postsecondary enrollment. Yet parent involvement and expectations are also related to parent income and education attainment, with those from poorer, less well educated families being less likely to be involved in schools or to hold high education expectations for their children (Lightfoot, 1978). Youth with disabilities tend to come from poorer families, and from families with lower education attainment (Marder & Cox, 1991). High schools that want to increase the postsecondary aspirations of their students need to reach out to parents and families, particularly targeting interventions to families that have not traditionally been involved in schools.

While many of the factors that were related to academic postsecondary enrollment also were related to enrollment in vocational postsecondary programs, the level of statistical significance was usually higher for those in academic programs. Factors were less important in differentiating students who enrolled in vocational programs than they were in distinguishing academic college students. This is consistent with research for the general population of youth. Hearn (1988), using data from the High School and Beyond study of 1980 high school seniors, show that broadening the definition of postsecondary education from attendance at 4 year colleges to attendance at 2 year and vocational schools reduces the relationship of family background factors to enrollment.

This initial exploration of the relationship of disability, individual, family and school factors to postsecondary education enrollment has uncovered many significant bivariate relationships. Yet this simple look at group differences does not present a clear picture of the independent relationships between these factors and postsecondary outcomes. Many of these factors are interrelated, as well as related to the nature and severity of students' disabilities. For example, students from higher socioeconomic status families were more likely to be group participants (Newman, 1991), students from this type of family were also more likely to be enrolled in postsecondary programs. If the confounding effects of socioeconomic status differences were removed, would there still be a significant relationship between group participation and postsecondary enrollment? Multivariate analysis is required to identify the relationship of factors to postsecondary enrollment, independent of these kinds of confounding influences.

We are currently working on further research utilizing multivariate techniques which will provide a more accurate picture of the lines of influence among these factors. With knowledge of these and other factors related to greater postsecondary school enrollment, schools and families might be better able to guide youth with disabilities on a path that would have a greater probability of leading to postsecondary education. This, in combination with recent federal legislation enacted to encourage development of model postsecondary education programs for youth with disabilities (PL 101-476, Sec. 1424a), might begin to lessen the gap in postsecondary education attainment between youth with disabilities and the general population.

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Appendix A BACKGROUND INFORMATION ON THE NLTS SAMPLE

This appendix provides somewhat greater detail on several methodological aspects of the NLTS, including:

- Data collection components.
- Sampling of districts, schools, and students.
- Weighting of NLTS data.
- Estimation and use of standard errors.
- Construction of comparison groups from the general population using the National Longitudinal Survey of Youth (U.S. Department of Labor).

Components of the NLTS

The NLTS has several components:

- **The Parent/Youth Survey.** In the summer and fall of 1987, parents were interviewed by telephone to determine information on family background and expectations for the youth in the sample, characteristics of the youth, experiences with special services, the youths' educational attainments (including postsecondary education), employment experiences, and measures of social integration. Parents rather than youth were selected as respondents for the first wave of data collection because of the need for family background information and because, with most students still being in secondary school and living at home, parents were believed to be accurate respondents for the issues addressed. The survey was repeated in 1990, when youth were interviewed if they were able to respond.
- **School Records.** In 1987 information was abstracted from students' school records for the most recent year in secondary school (either the 1985-86 or 1986-87 school year). This information related to courses taken, grades received (if in a graded program), placement, related services received from the school, status at the end of the year, attendance, IQ, and experiences with minimum competency testing. School transcripts were collected in 1990 for youth who had been in secondary school at any time since the 1986-87 school year.
- **School Program Survey.** In 1987, schools attended by sample students in the 1986-87 school year were surveyed for information on enrollment, staffing, programs and related services offered to secondary special education students, policies affecting special education programs and students, and community resources for the disabled.
- **Student School Program Survey.** In 1990, this survey obtained information about youth who still were in secondary school. Respondents were teachers familiar with students' school programs. They reported about students' in-class performance, class size, school climate, and transition planning activities that had occurred for each student.
- **Explanatory Substudies.** Studies involving subsamples of youth in selected disability categories examined in greater depth students' secondary school programs, the patterns of transition outcomes achieved by youth who were out of secondary school, and the relationship between school experiences and outcomes. Data were collected for in-school youth in 1988 and 1989 and for out-of-school youth in 1989.

The NLTS Sample

The initial NLTS sample was constructed in two stages. A sample of 450 school districts was selected randomly from the universe of approximately 14,000 school districts serving secondary (grade 7 or above) students in special education,* which had been stratified by region of the country, a measure of district wealth involving the proportion of students in poverty (Orshansky percentile), and student enrollment. Because not enough districts agreed to participate, a replacement sample of 178 additional districts was selected. More than 80 state-supported special schools serving secondary-age deaf, blind, and deaf-blind students also were invited to participate in the study. A total of 303 school districts and 22 special schools agreed to have their students selected for the study.

Analysis of the potential bias of the district sample indicated virtually no systematic bias that would have an impact on study results when participating districts were compared to nonparticipants on several characteristics of the students served, participation in Vocational Rehabilitation programs, the extent of school-based and community resources for the disabled, the configuration or other education agencies serving district students, and metropolitan status (see Javitz, 1990 for more information on the LEA sample). The one exception was a significant underrepresentation of districts serving grades kindergarten through eight. Many of these districts did not consider themselves as secondary school districts, even though they served grades seven and eight, which are considered secondary grade levels. In addition, bias may exist on factors for which data were not available for such comparisons.

Students were selected from rosters compiled by districts, which were instructed to include all students in special education in the 1985-86 school year who were in grades 7 through 12 or whose birthdays were in 1972 or before, whether or not they were served within the district or outside the district (e.g., in state-supported residential schools). Rosters were stratified into 3 age groups (13 to 15, 16 to 18, over 18) for each of the 11 federal special education disability categories and youth were randomly selected from each age/disability group so that approximately 800 to 1,000 students were selected in each disability category (with the exception of deaf-blind, for which fewer than 100 students were served in the districts and schools included in the sample).

In part because of the time lapse between sample selection and data collection, many students could not be located at the addresses or telephone numbers provided by the schools. Of the 12,833 students selected for the sample, about one-third could not be reached by telephone for the 1987 parent interview. (For more than half of these, addresses and telephone

* The 1983 Quality Education Data, Inc. (QED) database was used to construct the sampling frame. QED is a private nonprofit firm located in Denver, Colorado. Special education cooperatives and other special service units were not sampled directly (83% of special education students are served directly by school districts; Moore et al., 1988). However, instructions to districts for compiling student rosters asked districts to include on their listing any students sent from their district to such cooperatives or special service units. Despite these instructions, some districts may have underreported students served outside the district.

numbers were not provided by the schools/districts from which they were sampled.) This relatively high rate of inability to reach sample members confirmed the importance of including in the NLTS a substudy of nonrespondents to determine whether those who were reached for the telephone interview were a representative sample of the population to which the study was intended to generalize. To identify whether bias existed in the interview sample, interviewers went to 28 school districts with relatively high nonresponse rates to locate and interview in person those who could not be reached by telephone. Of the 554 sought for in-person interviews, 442 were found and interviewed, a response rate of 80%. A comparison of telephone interview respondents with in-person interview respondents showed that the telephone sample underrepresented lower-income households. The sample was reweighted to adjust for that bias, as described in the next section.

Two samples will be used for this investigation. The main sample on which most of the analysis will be based, includes between 2,000 and 3,000 youth from all disability categories who:

- Were ages 13 to 21 and students in special education in secondary schools in the 1985-86 school year.
- Were in secondary school in 1987 during the first wave of NLTS data collection and were out of secondary school in 1990 when the second wave of NLTS data collection took place. Hence, the sample includes youth out of school up to 3 years in 1990, a period of time in which school influences on transition are likely to be strongest.
- Were not living in institutions in 1987 or 1990.
- Had data on their secondary school programs (a transcript or school program content form). A school record abstract from 1987 is an insufficient source of school program data because it covered only one year and data on the entire school program are needed for this investigation.
- Had both a parent interview from 1987 and a parent/youth interview from 1990. Data from both time periods are needed because outcomes are measured in 1990, whereas several lagged variables included in the analyses are from when youth were in school (1987).

The second sample is a much smaller subset of the first. This sample includes youth from the main sample who were:

- 12th-grade or ungraded students
- Classified as learning disabled, speech impaired, emotionally disturbed, or mildly or moderately mental retardation.
- Exiters from secondary school in the 1988-89 or 1989-90 school years (no dropouts are included).

These youth were weighted to represent all youth enrolled in special education in the 1985-86 school year who had left secondary school by September 1987.

Weighting Procedures and the Population to Which Data Generalize

Youth with disabilities for whom data could be gathered were weighted to represent the U.S. population of students in special education in the 1985-86 school year who were in grades 7 through 12 or at least 13 years old. Because it is a sample of students at various ages, the NLTS sample does not generalize to youth who had dropped out of school before that age. For example, the sample of 18-year-olds generalizes to youth who were 18 and still in secondary school in 1985-86, not to all 18-year-olds with disabilities, many of whom may have left school at an earlier age.

In performing sample weighting for wave 1 (1987), three mutually exclusive groups of sample members were distinguished:

- (A) Youth whose parents responded to the telephone interview.
- (B) Youth whose parents did not respond to the telephone interview but were interviewed in person.
- (C) Youth whose parents did not respond to either the telephone or in-person interviews but for whom we obtained a record abstract.

A major concern in weighting was to determine whether there was a nonresponse bias and to calculate the weights in such a way as to minimize that bias. There was a potential for three types of nonresponse bias:*

- (1) Bias attributable to the inability to locate respondents because they had moved or had nonworking telephone numbers.
- (2) Bias attributable to refusal to complete an interview (only 3% of those available to be interviewed refused).
- (3) Bias attributable to circumstances that made it infeasible to locate or process a student's school record.

Of these three types of nonresponse, the first was believed to be the most frequent and to have the greatest influence on the analysis. Type 1 bias also was the only type of nonresponse that could be estimated and corrected.

The magnitude of type 1 nonresponse bias was estimated by comparing responses to items available for the three groups of respondents (after adjusting for differences in the frequency with which youth in different disability categories were selected and differences in the size of the LEAs selected). Group A was wealthier, more highly educated, and less likely to be minority

* We assumed that nonrespondents who could not be located because LEAs did not provide student names would have chosen to participate at about the same rate as parents in districts in which youth could be identified. The remaining nonrespondents would presumably have been distributed between the three types of nonresponse mentioned above.

than group B. In addition, group A was more likely to have students who graduated from high school than groups B or C (which had similar dropout rates). Groups A and B were compared on several additional measures for which data were unavailable for group C. The youth described by the two groups were similar on these additional items, including gender, employment status, pay, functional skills, association with a social group, and length of time since leaving school. Adjusting sample weights to eliminate bias in the income distribution eliminated bias in parental educational attainment and ethnic composition, but did not affect differences in dropout rates. Groups B and C were large enough that if they were treated the same as group A in the weighting process, the resulting dropout distribution would be approximately correct.

Sample weighting involved the following steps:

- Data from the first groups of sample members were used to estimate the income distribution for each disability category that would have been obtained in the absence of type 1 nonresponse bias.
- Respondents from all three groups were combined and weighted up to the universe by disability category. Weights were computed within strata used to select the sample (i.e., LEA size and wealth, student disability category and age).
- Weights from three low-incidence disability categories (deaf, orthopedically impaired, and visually impaired) were adjusted to increase the effective sample size. These adjustments consisted primarily of slightly increasing the weights of students in larger LEAs and decreasing the weights of students in smaller LEAs. Responses before and after these weighting adjustments were nearly identical. In addition, the three deaf/blind youth from medium-size or smaller districts, who had large weights, were removed from the sample to increase the effective sample size. Thus, NLTS results do not represent the very small number of deaf/blind students in medium-size or smaller LEAs.
- The resulting weights were adjusted so that each disability category exhibited the appropriate income distribution estimated in step 1 above. These adjustments were modest (relative to the range of weights within disability category); the weights of the poorest respondents were multiplied by a factor of approximately 1.6 and the weights of the wealthiest respondents were multiplied by a factor of approximately .7.

Because analyses of postschool outcomes included 1990 data for only a subset of youth, new weights were needed for 1990 data. The first step in weighting the 1,990 out-of-school youth was to identify a group of 3,046 youth who had been enrolled in special education in the 1985-86 school year, who had left secondary school by September 1987, and for whom we had sufficient data so that these youth had been given a weight in the wave 1 analysis. (This did not require that the parent of the youth complete a parent/guardian interview; having a school record abstract was sufficient to receive a wave 1 weight.) Use of this wave 1 weight allowed the results for these 3,046 youth to be projected to the corresponding national population (that is, youth who were enrolled in special education in secondary school in 1985-86 and who had left secondary school by September 1987).

The second step in weighting was to use the group of 3,046 youth and their wave 1 weights to calculate distributions of the following:

- **Age**—The primary categories were 15 to 17 years, individual years of age from 18 to 22, and a combined category of 23 and above.
- **Ethnic background**—The primary categories were black; white; Hispanic; and a combined category for Indian/Alaskan, Asian/Pacific Islander; and other. In addition there was a category for "don't know" or refusals, and a category for missing (typically because the data collection instrument that was completed for youth did not ask for this information).
- **School completion status**—The primary categories were graduated, aged out, and a combined category of dropped out, suspended, or expelled. In addition there was a category for "don't know" or "plans to return to school."
- **Gender.**
- **Household income in 1986** (or 1990 if 1986 data was not available). The primary categories were under \$12,000; \$12,000 to \$19,999; \$20,000 to \$24,999; under \$25,000 but otherwise unspecified; \$25,000 to \$37,999; \$38,000 to \$50,000; and over \$50,000. Those with incomes of \$25,000 or over but otherwise unspecified were grouped with those with household incomes between \$25,000 and \$37,999. In addition there was a category for those with missing information and a category for those who responded "don't know," refused to answer, or indicated that the youth was institutionalized.

The third step was the use of a weighting program to calculate weights for the 1,990 youth so that they matched the demographic distributions of the 3,046 youth. The weighting was accomplished using Deming's algorithm, which iteratively modified the wave 1 weights for the 1,990 youth until they generated demographic marginals that were very similar to those obtained using the 3,046 youth. Each disability class was weighted separately and in general the demographic marginals were matched within a fraction of 1 percent. (Only for the deaf/blind, where sample sizes were very small, did any marginals fail to match within 1 percent, and here they differed no more than 2%.)

Estimation of Standard Errors

The NLTS stratified cluster sample introduces design effects that reduce the precision of estimates for a sample of a given size, compared with a simple random sample. The design effects within the NLTS affect the precision of estimates to varying degrees for different subpopulations and different variables. Pseudo-replication is widely accepted as a variance estimation technique in the presence of design effects. However, it is not cost-effective for estimating the standard errors of the thousands of variables and subpopulations tabulated in the numerous NLTS reports and its statistical almanacs. Therefore, pseudo-replication was conducted on a limited number of variables to calibrate a cost-effective approximation formula, using the following procedures:

- A set of 25 variables representing the parent interview, school program survey, and record abstract was identified for the purpose of developing a statistical approximation formula; these included 16 nominal variables and 9 continuous variables.

- Standard errors of the weighted means of the selected variables were estimated in two ways. The first procedure involved pseudo- replication. For each variable, standard errors were calculated for students in each disability category and for the total sample (300 standard errors) using a partially balanced experimental design specifying how youth were to be allocated to 16 half-samples. The sample was split on the basis of the school districts and special schools from which youth originally were sampled. Districts and schools were paired on the basis of enrollment and a measure of poverty, and one member of each pair was assigned to each half-sample. Sample weights were computed for each half-sample as if those in the half-sample were the only study participants.

The following formula was used to estimate the standard error of the mean for youth in all conditions:

$$\text{Standard error} = [(1/16) \sum_i (M_i - M)^2]^{1/2}$$

where M_i is the mean calculated for youth in one of the 16 half- samples), M is the mean response calculated from the full sample, and the summation extends over all 16 half-samples. (Note that responses to questions from the school program survey were attached to the records of students in the responding schools so that means for these items were computed using student weights.)

- The second estimation procedure involved an approximation formula based on an estimate of the effective sample size for each disability category and the total sample. The sampling efficiency (E) for a group was calculated using the following formula:

$$E = M_w^2 / (M_w^2 + S_w^2)$$

where M_w and S_w are the mean and standard deviation of the student weights over all members of the group. The approximation formula for the standard error of the weighted mean of nominal variables is:

$$\text{Standard error} = [P(1-P)/(N \times E)]^{1/2}$$

where P is the full-sample weighted proportion of "yes" responses to a particular question in the group, N is the unweighted number of "yes" or "no" responses to the question in the group, and E is the sampling efficiency of the group. The approximation formula for the standard error of the mean of a continuous variable is:

$$\text{Standard error} = [S_2 / (N \times E)]^{1/2}$$

where S_2 is the variance of responses in the group for the continuous variable (computed with frequencies equal to full-sample weights) and N is the unweighted number of respondents to the question in the group. These formulas were used to compute a total of 300 standard errors for the same variables and groups addressed using pseudo-replication.

- To assess the accuracy of the standard errors produced by these formulas, we used scatter plots to compare them with standard errors produced using pseudo-replication. For both nominal and continuous variables, the approximate best fit was a 45 degree line. That is, on average, the formula based on estimates of effective sample size neither systematically overestimated nor underestimated the standard error obtained using pseudo-replication, arguing for use of the more cost-effective estimation formulas. However, because error remains in the estimates that might result in underestimating the true standard errors in some instances, we took a conservative approach and multiplied the standard errors produced using the estimation formulas by 1.25. The vast majority of the standard errors so obtained were larger than the standard errors obtained by pseudo-replication. Thus, standard errors were calculated using the effective sample size estimation formulas and increased by a factor of 1.25.

Creating Comparison Groups from the General Population of Youth

We have created two comparison groups from the general population of youth to use as benchmarks against which to interpret outcomes of youth with disabilities. The first group is a sample of youth from the general population, based on data from the National Longitudinal Survey of Youth (NLSY, U.S. Department of Labor). This group permits us to identify differences between youth with disabilities and the general population. However, we cannot attribute those differences to the presence of a disability because Chapter 2 has illustrated that youth with disabilities differed from youth in the general population on demographic characteristics that would be expected to influence their outcomes (e.g., gender, ethnicity). Hence, a second comparison group was constructed from the NLSY that has the same distribution as youth with disabilities on important demographic variables. The construction of these two groups is described below.

The NLSY contains data for more than 12,000 noninstitutionalized youth who were between the ages of 13 and 21 in 1979. These youth have been interviewed annually from 1979 to the present concerning a wide variety of topics, including their family background, schooling, employment, marital status, and living arrangements. For the present study, data from the 1979-1983 interviews were used; after those years, youth in the NLSY were generally older than youth in the NLTS.

Because the universe of the NLTS is youth who were in special education programs in 1985-86, while the universe for the NLSY is all youth (regardless of present or past school status), the following steps were taken to achieve comparability. First, only NLSY youth who were currently in school or had been in school during the current or previous academic year were included in the analysis. Second, comparisons were restricted to youth between 15 and 20 years of age. This was done primarily because very few NLSY youth over age 20 met the requirement of having been in secondary school the academic year before the interview. Little is lost by this restriction because the NLTS sample contains very few individuals below the age of 15 and relatively few over age 20.

Thus, we used all the in-school observations and any observations when a person was out of school, but had been in school during the academic year before the interview. There were up to 5 in-school interviews for a given youth. For most people, only one out-of-school observation was included. Two out-of-school interviews could occur if a youth left school during an academic year but before the spring interview. In that case, the interviews of the spring of that academic year and the next spring were included.

NLSY provides sampling weights based on respondents' probability of selection. However, our use of multiple observations per respondent for many analyses resulted in older youth being overrepresented. We corrected this bias by multiplying each individual's weight by:

Weighted N of individuals of the youth's age in 1980

Weighted N of the youth's age for all observations in the sample.

For analyses that used multiple observations, this weight was used. For analyses that used one observation only (for instance, data on arrests came only from the 1980 interview), the original weight supplied by the NLSY was used.

As indicated above, youth with disabilities differ in several demographic characteristics from the general population of youth. The comparison group we constructed to "hold constant" these differences was formed by weighting the NLSY data to match the distribution of selected demographic characteristics of youth with disabilities. Using these weights, the comparison population has the same distributions of gender, ethnicity, and head of household's education as the population of youth with disabilities.

Despite our adjustments, some important noncomparabilities remain. They are as follows:

- **Respondent.** NLTS interviewed parents, while NLSY interviewed youth. Although there is some evidence that parents in the general population tend to underreport the employment activities of their teenage children (Freeman and Medoff, 1982), the extent to which parents and youth differ in reporting other phenomena is not known.
- **Month of Interview.** The modal month of interview was August for the NLTS and March for the NLSY. The two outcomes most affected by differences in timing of interview are school completion status and employment status. Fortunately, NLSY data included youths' employment status as of August 15, and we were able to construct a variable on school completion status as of the summer after the interview. However, most data on occupational distributions, part-time/full-time status, and wages come from the summer for NLTS youth and the spring for NLSY youth.
- **Year of Interview.** NLTS interviews took place in 1987, while NLSY data come from 1979-1982. Readers should be sensitive to the fact that period effects may have influenced some variables. We adjusted for period effects for only one variable, wages, by operationalizing wages as the percent of the population earning the minimum wage or less.
- **Time out of school.** The most important consequence of differences in the month of interview affect analyses of data for youth who were no longer in secondary school. More than three-fourths (76%) of NLSY secondary school graduates in the

sample (weighted) had been out of school between 9 and 11 months when they were interviewed. In contrast, about 56% of NLTS graduates had been out of school about 2 months, and about 44% had been out of school about 14 months.

- **Unmeasured or uncontrolled demographic differences.** The groups may continue to differ in unmeasured ways or in ways that were not adjusted for in the reweighting. For example, we were not able to weight the comparison population by urbanicity, despite knowing that NLTS and NLSY samples differ significantly on this factor, because of noncomparability of the measures of urbanicity in the two data sets.
- **Exact wording of questions and response categories.** Wording of questions and response categories differed between the NLTS and the NLSY. Considerable research has shown responses to items can be affected by these types of differences (e.g., Hippler, Schwarz, and Sudman, 1987).

VARIABLE SPECIFICATIONS--INDIVIDUAL CHARACTERISTICS

Disability Category

For all crosstabulations throughout this report, youth are assigned to a disability category based on the primary disability designated by each youth's school or district in the 1985-86 school year. This designation of youth's disabilities, which was the basis of their being sampled for the NLTS, came from rosters of all secondary students in special education submitted by districts included in the study. The primary disability category of each student was designated by the district on the roster. Because we have relied on category assignments made by schools and districts, NLTS data should not be interpreted as describing youth who truly had a particular disability, but rather as describing youth who were categorized as having that disability by their school or district. Hence, descriptive data are nationally generalizable to youth who were classified as having a particular disability in the 1985-86 school year.

Functional Mental Skills

In 1987, parents were asked, *How well does (NAME) do each of the following things on his/her own, without help? Look up telephone numbers in the phone book and use the phone; tell time on a clock with hands; read and understand common signs like STOP, MEN, WOMEN, or DANGER; count change. For each task: Would you say very well, pretty well, not very well, or not at all well?*

For analyses in this report, a scale was formed by assigning a value of 4 to very well, 3 to pretty well, 2 to not very well and 1 to not at all well. Scores were summed for the four tasks to create a scale ranging from 4 to 16. This scale was then further broken down into three categories: low (4 to 8), medium (9 to 14), and high (15 or 16). Youth who were missing one or more of the items that make up the scale were omitted from crosstabulations using the scale.

Self-Care Skills

In 1987, parents were asked, *How well does (NAME) do each of the following things on his/her own, without help: dress himself/herself completely; feed himself/herself completely; get places outside the home, like to school, to a nearby store or park, or to a neighbor's house. Would you say very well, pretty well, not very well, or not at all well?*

For analyses in this report, a scale was formed by assigning a value of 4 to very well, 3 to pretty well, 2 to not very well, and 1 to not at all well. Scores were summed for the three tasks to create a scale ranging from 3 to 12. This scale was then further broken down into three categories: low (3 to 6), medium (7 to 10), and high (11 or 12).

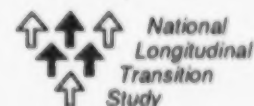
Youth who were missing one or more of the items that make up the scale were omitted from crosstabulations using the scale. Further, this question was asked only of parents of youth who were classified by their school districts as mentally retarded, visually impaired, deaf, orthopedically impaired, other health impaired, multiply handicapped, or deaf/blind. They were not asked of parents of youth who were classified as learning disabled, emotionally disturbed, speech impaired, or hard of hearing, with no other disabilities because such disabilities were assumed not to interfere in most cases with the performance of the basic self-care skills being investigated. Youth in these categories were assigned a value corresponding to very well for each item, which would sum to a score of 12 (high) on the corresponding scale. If the skills of youth in these categories actually were lower, the reported self-care skills scores overestimate abilities.

Community Living Skills

In 1990, parents were asked, *How well could (NAME) do each of the following things on his/her own, without help: Go to a library or community swimming pool; use public transportation to get around town, like a bus or taxi; buy his/her own clothes at a store; arrange a plane or train trip to go out of town. For each task: Could he/she do it very well, pretty well, not very well, or not at all well?*

For analyses in this report, a scale was formed by assigning a value of 4 to very well, 3 to pretty well, 2 to not very well, and 1 to not at all well. Scores were summed for the four tasks to create a scale ranging from 4 to 16. This scale was then further broken down into four categories: low (4 to 6), medium low (7 to 11), medium high (12 to 15), and high (16). Youth who were missing one or more of the items that make up the scale were omitted from crosstabulations using the scale.

**National Longitudinal Transition Study
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